Chapter 4 (Traffic Signals) 2004 North Carolina Supplement to the MUTCD

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General Format

2004:

- What's (not) in the 2004 NC Supplement

2001 NC Supp.: What was in the 2001 NC Supplement and what changed for 2004

2003 MUTCD: What's in the 2003 MUTCD (how the 2004 Supplement varies)

General Change

In 2004 Supplement:

- Units are in English with metric in parentheses
- Compatible with all other NCDOT standard specs and publications

2001 NC Supp.: Metric (English) to match *MUTCD*

2003 MUTCD: Metric (English)

Sections 4D.04-05 Meaning/ Application of Vehicular Steady Signal Indications

In 2004 Supplement:

- Right turns on RED (CIRCULAR or ARROW) allowed unless sign is posted to prohibit movement

2001 NC Supp.: No Change

2003 MUTCD: CIRCULAR RED - Turn on Red allowed unless sign prohibits turn
RED ARROW – No turn on Red allowed unless sign permits turn

Section 4D.04 Meaning of Vehicular Signal Indications

NOTE:

In accordance with NC statutes and motor vehicle codes, left turns on Red are still prohibited at all intersections.

Section 4D.05 Application of Steady Signal Indications

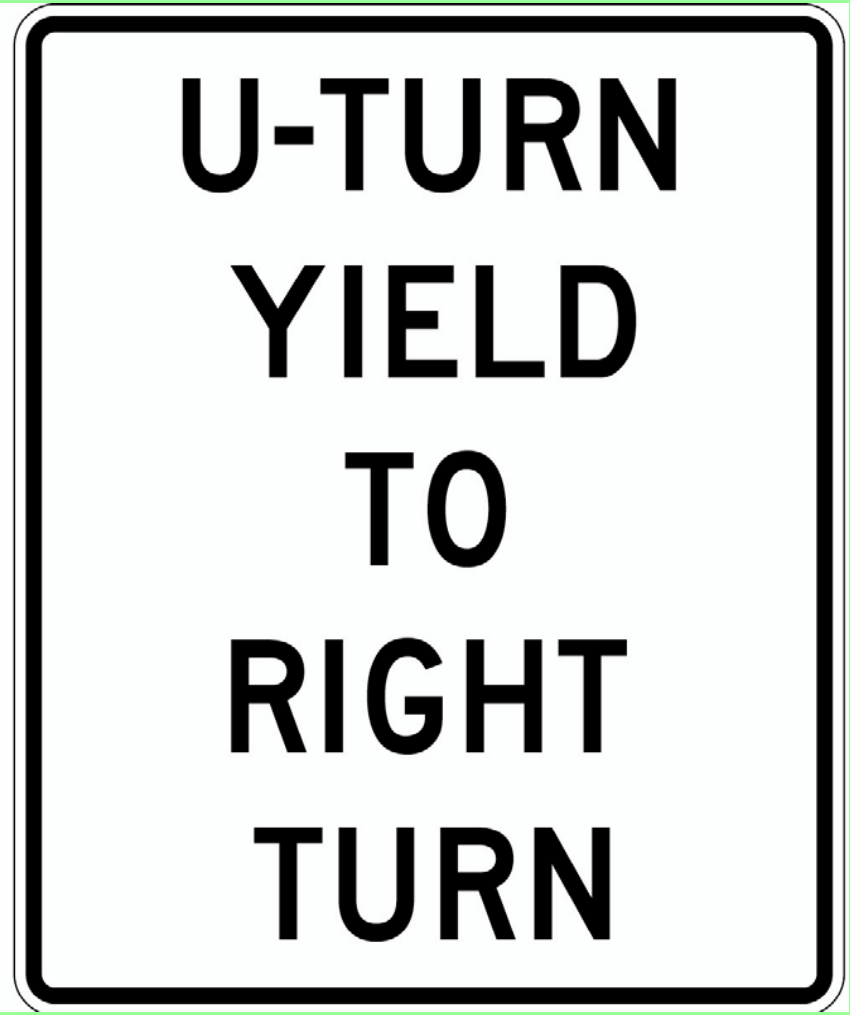
In 2004 Supplement:

- **STANDARD** - Use "U-TURN MUST YIELD TO RIGHT TURN" sign (R10-16) when left Arrow is displayed simultaneously with a right Arrow creating a conflicting movement and median exists.

2001 NC Supp.: Previously **STANDARD** in Section 4D.06

2003 MUTCD: New in 2003. Appears in Section 4D.05 as an Option

Section 4D.05 Application of Steady Signal Indications



Sign R10-16 used when a median exists and U-turn moving on GREEN ARROW conflicts with overlapping right turn moving on a Right GREEN ARROW.

Section 4D.05 Application of Steady Signal Indications

NOTE: Existing "U-TURN MUST YIELD" (R3-27) signs may be used in place of sign R10-16 for the remainder of its useful service life.

Section 4D.05 Application of Steady Signal Indications

Signs like this, however, are not acceptable and need to be replaced.

Section 4D.10 Yellow Change and Red Clearance Intervals

In 2004 Supplement:

- **STANDARD -** Red Clearance interval shall follow Yellow Change interval

2001 NC Supp.:	No Change
2003 MUTCD:	Option: Yellow Change interval may be followed by a Red Clearance interval (not required)

Section 4D.10 Yellow Change and Red Clearance Intervals

In 2004 Supplement:

- Guidance - Removed duration of Yellow Change intervals (New calculations in *2004 TMSSU Design Manual)*

2001 NC Supp.: Yellow change interval should be 4.0-5.5 seconds

2003 MUTCD: Yellow Change interval should be 3-6 seconds

Section 4D.10 Yellow Change and Red Clearance Intervals

In 2004 Supplement:

- Guidance - Red Clearance interval should be 1.0-6.0 seconds (New calculations in *2004 TMSSU Design Manual)*

2001 NC Supp.: Red Clearance interval should be at least 1.0 sec.

2003 MUTCD: Red Clearance interval should not exceed 6 seconds.

Yellow Change and Red Clearance Intervals

- New Formulas and calculations in *TMSSU Design Manual*
- Yellow change interval is usually between 3-6 seconds
- Red clearance interval is usually between 1-4 seconds

Section 4D.10 Yellow Change and Red Clearance Intervals

In 2004 Supplement:

- **STANDARD -** Red light photo enforcement shall not be determination for calculating duration of Yellow Change and Red Clearance times. (Times based on sealed plan of record for location.)

2001 NC Supp.: No Change

2003 MUTCD: Not in *MUTCD*

Section 4D.12 Flashing Operation of Traffic Control Signals

In 2004 Supplement:

- **STANDARD** - Traffic signals with Railroad Preemption shall not be programmed for off-peak flash

2001 NC Supp.: No Change

2003 MUTCD: Not in *MUTCD*

Section 4D.12 Flashing Operation of Traffic Control Signals

New for 2004 Supplement:

• Guidance - A study should be conducted and review program established before a signal is programmed for off peak flashing operation

2001 NC Supp.: Signals should flash during off peak hours unless a study reveals otherwise

2003 MUTCD: Not in *MUTCD*

Section 4D.15 Size, Number, and Location of Signal Faces by Approach

In 2004 Supplement, in addition to criteria in *MUTCD*, use 12” signal heads:

- Design speed exceeds 35 MPH (40 MPH or above)
- Ramp terminals where traffic exits a superhighway

2001 NC Supp.: No Change

2003 MUTCD: Guidance – 12” heads if speeds exceed 40 MPH; No criteria for ramp terminals

Section 4D.15 Size, Number, and Location of Signal Faces by Approach

NOTE: 2003 *MUTCD* now allows (12”) signal heads to be placed 180 feet from the stopbar before a supplemental (near side) head is required.

North Carolina does not require the use of supplemental heads for turn lanes.

And now, we interrupt this presentation for a Public Service Announcement

Section 4D.15 Size, Number, and Location of Signal Faces by Approach

In accordance with the 2000 (and 2003) *MUTCD*, all ARROW sections **SHALL** be 12” sections.

Section 4D.15 Size, Number, and Location of Signal Faces by Approach

This ruling was effective as of January 17, 2001. There was no "phase in" or compliance grace period.

Section 4D.16 Number and Arrangement of Sections in Signal Faces

This Section was Removed for 2004 Supplement:

- New legislation passed that allows the use of horizontal signal heads; now conform w/ *MUTCD*

2001 NC Supp.: Only allows vertical signal heads

2003 MUTCD: Allows both vertical and horizontal signal heads

Horizontal Signal Heads

Use will be limited and not be wide spread. Likely to be considered:

- Metal poles w/ mastarms where existing clearances of mastarms are low
- Existing spans where heads are too low
- Upgrading to 12” heads will not provide adequate vertical clearance
- Near/under bridges, where there are visual obstructions if heads mounted vertically

Section 4D.17 Visibility, Shielding, and Positioning of Signal Faces

In 2004 Supplement:

- **STANDARD** - Bottom of signal housing suspended over roadway shall be at least 16.5 feet (5.0 m) above the crown of pavement

2001 NC Supp.: No change

2003 MUTCD: Bottom of signal housing must be at least 15 feet (4.6 m) above pavement

Section 4D.17 Visibility, Shielding, and Positioning of Signal Faces

Removed for 2004 Supplement:

- Removed maximum height for clearance of signal head over roadway; now conform w/*MUTCD*

2001 NC Supp.: Bottom of signal housing must be no more than 19 feet (5.8 m) above crown of pavement

2003 MUTCD: **Top** of signal housing over roadway must be no more than least 25.6 feet (7.8 m) above pavement

Section 4D.18 Design, Illumination, and Color of Signal Sections

In 2004 Supplement:

- Guidance - Exterior of signal sections and visors should be highway yellow; option provided for dark green or black if meet any 1 of 3 criteria

2001 NC Supp.: Location had to meet all 3 criteria before dark green or black heads used

2003 MUTCD: Removed all reference to exterior colors of signal sections

Section 4D.18 Design, Illumination, and Color of Signal Sections

Criteria to use green or black signal heads (Must meet any 1 of 3):

- Low speed locations (Less than 40 MPH)
- Historic district or Central Business District
- Local municipality is responsible for maintenance

Chapter 4E Pedestrian Control Features

Chapter/ Section removed in 2004 due to updated sections in *MUTCD*; now conform w/ *MUTCD*

2001 NC Supp.:	Listed requirements for Accessible Pedestrian Signals
2003 MUTCD:	Updated section for Accessible Pedestrian Signals; Includes info on Countdown Pedestrian Heads and Pedestrian Detectors

Sections 4F.02-3 Design/Operation of Emergency-Vehicle Traffic Control Signals

In 2004 Supplement:

- **STANDARD** - 12” steady Red and Yellow with 8” Flashing Yellow shall be standard display for EV signal at a mid-block location; Green indication is prohibited, otherwise conform w/*MUTCD*

2001 NC Supp.: No Change

2003 MUTCD: Signal display is a Guidance and 8” Flashing Yellow or steady Green may be used

Section 4K.02 Intersection Control Beacon

In 2004 Supplement:

- **STANDARD** - Minimum of 2 sections with appropriate lenses for each approach to intersection

2001 NC Supp.: No Change

2003 MUTCD: One or more sections required for each approach to an intersection

Section 4K.02 Intersection Control Beacon

In 2004 Supplement:

- Guidance - Align beacons vertically over roadway for single lane approach and flash alternately

2001 NC Supp.: No Change

2003 MUTCD: No specific criteria other than Chapter 4D

Section 4K.02 Intersection Control Beacon

In 2004 Supplement:

- Guidance - Align beacons horizontally over roadway for multi-lane approach and flash simultaneously.

2001 NC Supp.: No Change

2003 MUTCD: No specific criteria other than Chapter 4D

Section 4K.03 Warning Beacon (Flashing Yellow Beacon on Signs)

In 2004 Supplement:

- **STANDARD** - 2 lenses aligned horizontally shall flash simultaneously; 2 vertically aligned lenses shall flash alternately.

2001 NC Supp.: No Change

2003 MUTCD: Option that if warning beacon has more than one section, they may flash either alternately or simultaneously.

Section 4K.03 Warning Beacon (Flashing Yellow Beacon on Signs)

In 2004 Supplement:

- Guidance - Edge of beacon housing should be no closer than 12 inches (300 mm) outside the nearest edge of the sign

2001 NC Supp.: No Change

2003 MUTCD: Not referenced in *MUTCD*

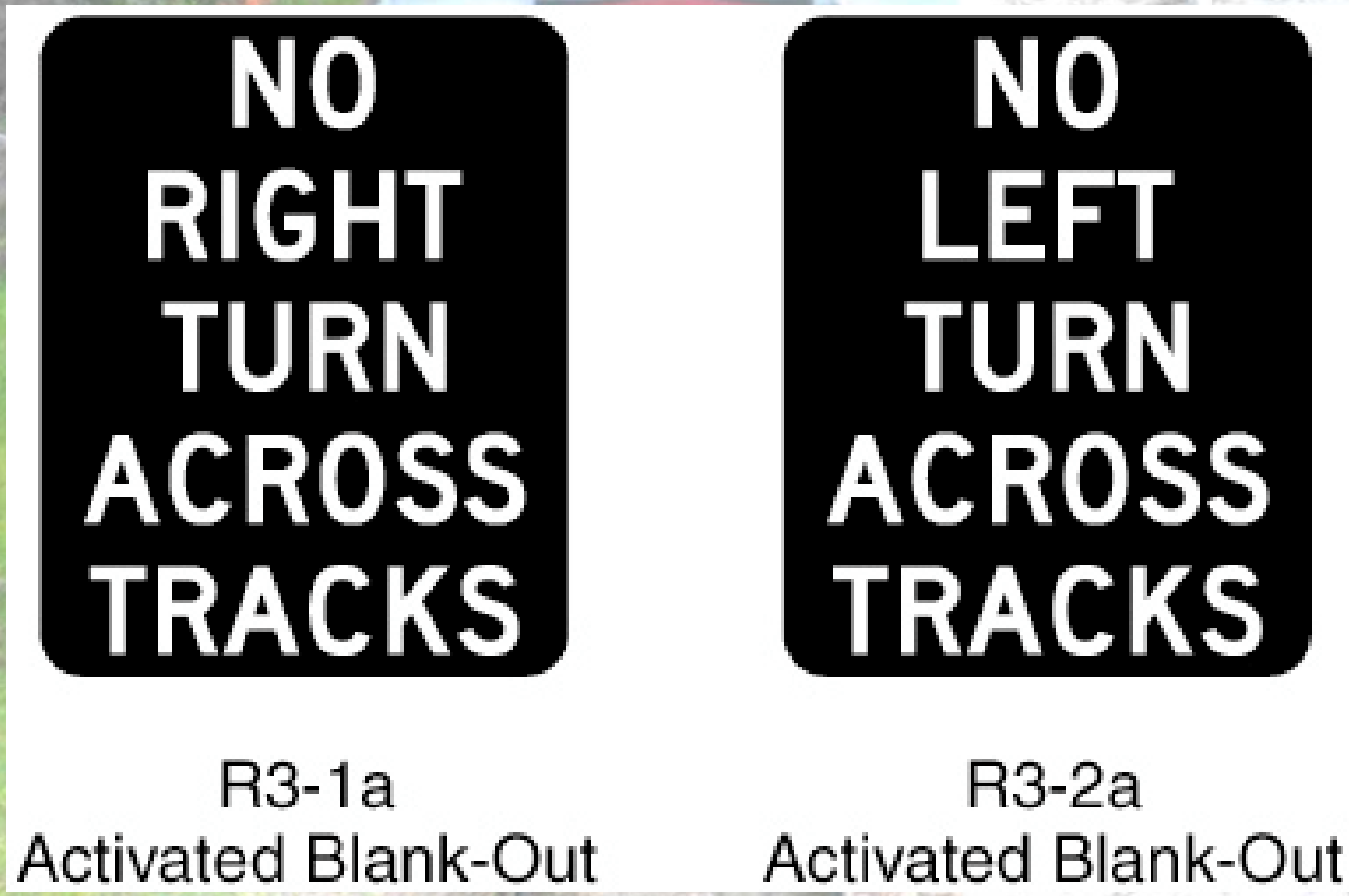
Railroad Issues

Beware of these changes in the *MUTCD* that impact traffic signals near highway-rail grade crossings (Railroad Preemption).

Section 8B.06 Turn Restrictions During Preemption (Blankout Signs)

Existing signs used in NC

Section 8B.06 Turn Restrictions During Preemption (Blankout Signs)



R3-1a
Activated Blank-Out

R3-2a
Activated Blank-Out

Signs in *MUTCD*; May be used in NC

Section 8B.06 Turn Restrictions During Preemption

- Blankout signs (R3-1a and R3-2a) now mentioned in *MUTCD*; Previously were not covered
- Do not use "DO NOT ENTER" blankout sign
- Do not use with RED ARROWs.
- NC may experiment with use of new sign verbage in *MUTCD*

Section 2C.39 Traffic Signal Signs

W25-1

W25-2

Section 2C.39 Traffic Signal Signs (Signs W25-1 and W25-2)

- Generally used at traffic signals near highway-rail grade crossings that have Railroad Preemption and potential exists for yellow trap
- Used to alert motorist to possible yellow trap condition when signal enters preempt (W25-2)
- In limited cases, alerts motorist to presence of a full-time yellow trap condition (W25-1)

Questions??

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